Astrophysics Research And Analysis

Extreme Energy Particle Astrophysics with ANITA-V JPL Co-I Proposal

Completed Technology Project (2017 - 2021)

Project Introduction

This proposal is part of a larger proposal, Extreme Energy Particle Astrophysics with ANITA-V, with Peter Gorham as PI. The ANtarctic Impulsive Transient Antenna (ANITA) probes the ultra-high energy (UHE) cosmic particle spectrum through multiple channels. It was originally designed to search for the radio impulsive transient emission from UHE neutrino interaction in ice known as the Askaryan effect. After its first flight it was discovered that ANITA is sensitive to the geomagnetic emission from UHE cosmic ray air showers in the atmosphere, which is distinguishable from neutrinos by the polarization of the signal. This channel also provides sensitivity to up-going air showers such as those produced by tau neutrino interactions in the upper subsurface layers of the Earth leading to a tau decay air shower in the atmosphere. This detection channel will be the focus of ANITA-V. The Jet Propulsion Laboratory will provide attitude determination subsystems. As in previous flights, this includes a suite of sun sensors, a magnetometer, and accelerometers. JPL also provides support for data analysis, photogrammetry, and thermal modeling of the payload.

Anticipated Benefits

The Astrophysics Research and Analysis program (APRA) supports suborbital and suborbital-class investigations, development of detectors and supporting technology, laboratory astrophysics, and limited ground based observing. Basic research proposals in these areas are solicited for investigations that are relevant to NASA's programs in astronomy and astrophysics, including the entire range of photons, gravitational waves, and particle astrophysics. The emphasis of this solicitation is on technologies and investigations that advance NASA astrophysics missions and goals.

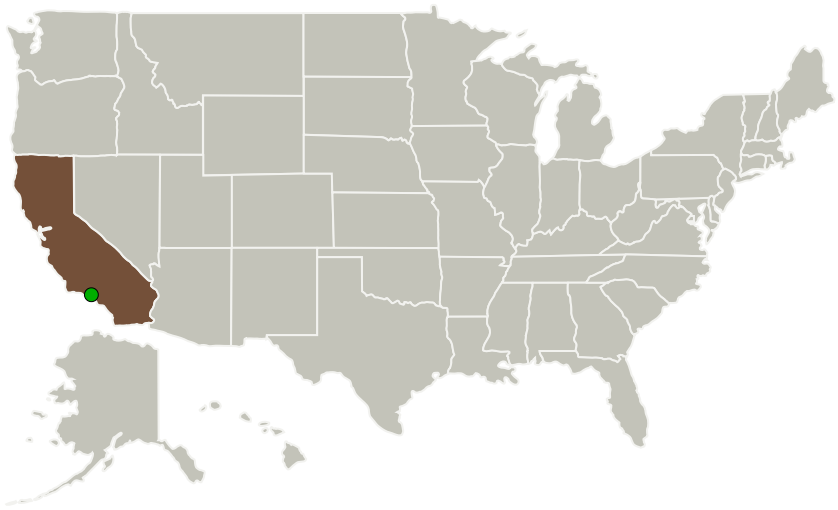
Extreme Energy Particle Astrophysics with ANITA-V JPL Co-I Proposal

Table of Contents

Extreme Energy Particle Astrophysics with ANITA-V JPL Co-I Proposal

Completed Technology Project (2017 - 2021)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
California Institute of Technology(CalTech)	Lead Organization	Academia	Pasadena, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
California

Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Organization:

California Institute of Technology (CalTech)

Responsible Program:

Astrophysics Research and Analysis

Project Management

Program Director:

Michael A Garcia

Program Manager:

Dominic J Benford

Principal Investigator:

Andrew F Romero-wolf

Co-Investigators:

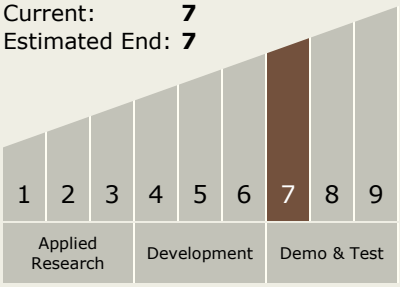
Konstantin Belov
Karen R Piggee

Extreme Energy Particle Astrophysics with ANITA-V JPL Co-I Proposal

Completed Technology Project (2017 - 2021)

Technology Maturity (TRL)

Start: **7**
Current: **7**
Estimated End: **7**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors

Target Destination

Outside the Solar System